

A NEW, ECONOMICALLY IMPORTANT CRAYFISH
(DECAPODA: CAMBARIDAE) FROM THE
NECHES RIVER BASIN, TEXAS, WITH A
KEY TO THE SUBGENUS *FALLICAMBARUS*

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Abstract.—*Fallicambarus (F.) devastator*, a new burrowing species, is described from Angelina County, Texas. One of only three members of the genus in which the males possess hooks on the ischia of the third and fourth pereopods, it may be distinguished from the other two, *F. (F.) dissitus* Penn and *F. (F.) macneesei* Black, in lacking a spine on the lateral margin of the mesial ramus of the uropod.

The existence of this economically important crayfish came to the attention of the first author through an Associated Press article appearing in the *Cumberland Times/News* (Cumberland, Maryland, on 15 May, 1986) that was sent to him by a former companion on field trips, Robert H. Gilpin. Correspondence with the second author, whose name was mentioned in the article, resulted in the subsequent arrival at the Smithsonian Institution of a series of specimens of this crayfish collected at the municipal airport at Lufkin, Texas. Much to our surprise, it belongs to a previously undescribed species. Because of its being a local seasonal nuisance and its negative impact on farming in what is believed to be a large segment of the Neches River basin, methods are being sought to control this burrowing species that in some areas is responsible for constructing over 25,000 earthen mounds per acre.

Even though there seems to be little reason to believe that other crayfishes are responsible for the devastation wrought on farm lands and lawns throughout much of the Neches Basin, the identities of populations other than that represented in the description herein must await a survey planned for the coming months. A more complete

report on the geographical and ecological distribution of the species with observations on population density and habits is anticipated to result from the proposed survey.

The name proposed for this crayfish reflects the respect that it has commanded from local farmers and other residents who garden or cultivate lawns.

Fallicambarus (Fallicambarus) devastator,
new species
Figs. 1, 2

Diagnosis.—Antennal scale reduced but with acute apical spine slightly overreaching basal article of antennular peduncle; ventral surface of propodus of cheliped lacking row of stiff setae along lateral margin; 2 ventral rows of tubercles on merus of cheliped clearly defined; mesial ramus of uropod lacking distomedian and distolateral spines, or, if distomedian spine present, minute and not nearly reaching apex of ramus; both rami subacute to acute distally. Telson without transverse suture but with pair of oblique incisions. Coxa of fourth pereopods of male with very strong caudomesial boss having almost straight caudoventral margin; ischia of third and fourth pereopods with hooks,

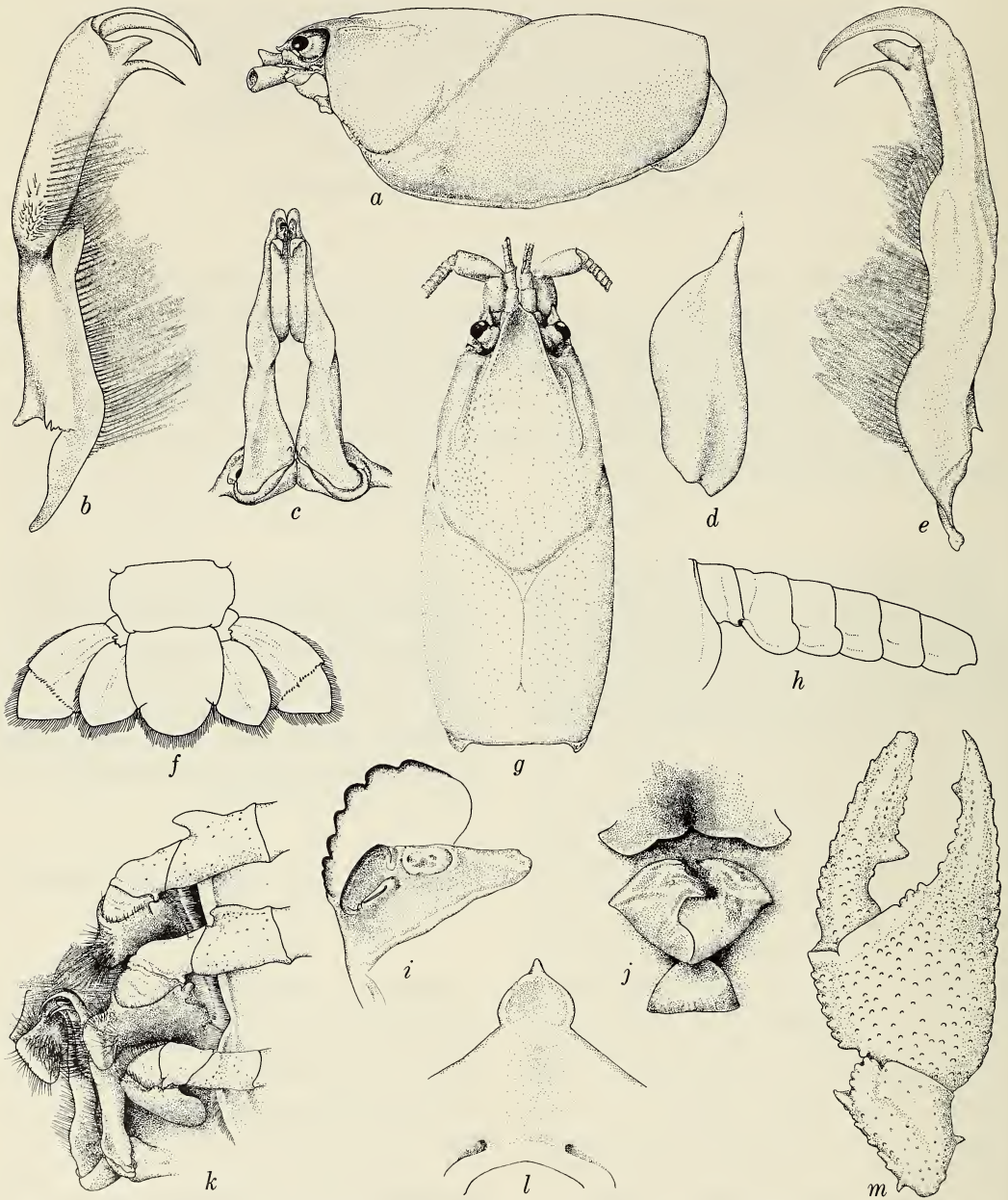


Fig. 1. *Fallicambarus (F.) devastator* (all from holotype except f and j which from allotype): a, Lateral view of cephalothorax; b, Mesial view of first pleopod; c, Caudal view of first pleopods; d, Right antennal scale; e, Lateral view of first pleopod; f, Dorsal view of caudal part of abdomen; g, Dorsal view of cephalothorax; h, Lateral view of abdominal segments; i, Cephalic view of mandible; j, Annulus ventralis and adjacent sternal features; k, Ventrolateral view of basal podomeres of third, fourth, and fifth pereiopods and first pleopods; l, Epistome; m, Dorsal view of distal podomeres of first pereiopod.

that of third opposed by very weak tubercle on basis. Chela almost twice as long as wide and palm with length of mesial margin only slightly more than half its width. First pleopod of first form male arched and bearing comparatively strongly developed, caudo-distally-directed cephalic process; mesial process spiculiform, strongly curved at base with apical two-thirds almost straight and directed subcaudally; central projection strongly arched, scythelike, with apex directed proximally. Annulus ventralis broadly excavate anteriorly, not obscuring post-annular sclerite in ventral aspect. Areola obliterated to linear, ranging from 37.7 to 40.5 percent of carapace length and 43.0 to 45.8 percent of postorbital carapace length.

Holotypic male, form I.—Body suboval, somewhat compressed laterally (Fig. 1a, g). Abdomen narrower than thorax (13.6 and 18.9 mm). Greatest width of carapace distinctly posterior to caudodorsal extremity of cervical groove and only slightly less than height (18.9 and 19.1 mm). Areola linear over most of its length and comprising 39.4 percent of entire length of carapace (44.4 percent of postorbital carapace length). Rostrum with convergent, only slightly thickened margins contracting anteriorly, forming short, indistinctly delimited, triangular acumen, apex of which corneous, slightly upturned, and extending just beyond proximal margin of penultimate podomere of antennular peduncle. Dorsal surface of rostrum strongly concave, particularly in anterior region, with submarginal rows of setiferous punctations and few scattered ones between. Subrostral ridges well developed and evident in dorsal aspect, but scarcely so, to base of acumen. Postorbital ridge well defined anteriorly, but sclerotized anterior crest rather short; posterior swelling clearly evident. Suborbital angle obsolete. Branchiostegal and cervical spines absent. Carapace punctate dorsally and anterolaterally, weakly granulate over ventral half of branchiostegites; extreme anteroventral branchiostegal region inflated, with distinct row

of 8 or 9 closely-set tubercles on ventral flank of cervical groove, and 3 or 5 on dorsal flank.

Abdomen (Fig. 1h) shorter than carapace (36.8 and 43.1 mm); pleura very short and broadly rounded ventrally, only that of sixth segment with angular caudoventral margin; pleuron of first abdominal segment only slightly overlapped by that of second. Telson of holotype marred by injury in prior instar (see illustration of allotype in Fig. 1f); cephalic section without spines, but set off from caudal section by oblique shallow incisions and sutures; entire dorsal surface with setiferous punctations. Proximal podomere and both rami of uropod without spines except along diarsis of lateral rami, and apical part of rami strongly tapering distally, forming subacute tips; median ribs well developed but that of neither ramus reaching distal margin.

Cephalomedian lobe of epistome (Fig. 1i) submucronate and rather deeply excavate ventrally; main body long, with median area weakly depressed but lacking fovea. Ventral surface of proximal podomere of antennule with median spine slightly distal to midlength. Antennal peduncle without spines, flagellum reaching midlength of sixth abdominal segment. Antennal scale (Fig. 1d) approximately 3 times as long as broad, widest distal to midlength, and with irregular, but subparallel, mesial and lateral margins; mesiodistal margin broadly rounded. Structure of mandible depicted in Fig. 1i. Ventral surface of ischium of third maxilliped with lateral row of fine, very short setal tufts, mesial sector with 2 irregular longitudinal bands of stiff setae and few patches between bands; more lateral band made up of staggered clusters.

Right chela (Fig. 1m) approximately twice as long as broad, strongly depressed; mesial margin of palm slightly longer than half width of palm and bearing row of 7 (left with 6) tubercles subtended dorsolaterally by row of 6 smaller ones, and ventrolaterally by unevenly spaced row of 4 (evenly spaced

on left); dorsal surface of palm and basal part of fingers studded with squamous tubercles; tubercles along lateral margin of chela forming subserrate row extending from near proximal extremity to base of distal fourth of fixed finger; ventral surfaces of palm, basal third of fixed finger, and basal half of dactyl mostly tuberculate, both fingers with more prominent punctations than tubercles distoventrally, there flanking, and, in part disrupting, weak median longitudinal ridges; prominent tubercle on oblique ventral ridge opposite base of dactyl. Opposable margin of fixed finger with row of 8 tubercles (10 on left); distalmost very small and situated in distal fourth of finger beyond largest tubercle, 3 subjacent tubercles forming proximal cluster opposing basal concavity on dactyl; single row of minute denticles between largest tubercle and base of corneous tip of finger. Opposable margin of dactyl with small tubercle in distal part of proximal concavity followed by very large tubercle at distal end of concavity; apical part of right cheliped broken but left with row of 8 much smaller tubercles between large tubercle and base of distal seventh of finger; single row of minute denticles (interrupted by just-mentioned tubercles) extending from major tubercle to corneous tip of finger.

Carpus of cheliped bearing poorly delimited, submedian, sinuous, longitudinal furrow dorsally, flanked mesially by punctations and tubercles and laterally by scattered punctations; mesial surface tuberculate; dorsomesial angle bearing row of 6 tubercles, distalmost of which lying at base of prominent spurlike tubercle at dorsal distomesial angle of podomere; ventral surface devoid of tubercles except for 2 prominent ones on distal margin, one mesially and other associated with distolateral articular condyle; lateral surface sparsely punctate. Merus weakly serrate dorsally, three distalmost serrations in form of spiniform tubercles; mesial and lateral surfaces punctate; ventral surface with mesial row of 17 (left with 15)

tubercles and lateral one of 13; few additional small tubercles adjacent to rows. Medioventral margin of basioischial podomere with row of 3 inconspicuous tubercles distal to fracture suture; compound podomere otherwise with scattered punctations. Chela of second pereopod with marginal row of setae on palm, and carpus with dorsal row of long setae; mesial surface of propodus and carpus lacking tufts of plumose setae.

Ischia of third and fourth pereopods (Fig. 1k) with simple hooks; that of third overreaching basioischial articulation and both opposed by small, inconspicuous tubercle on corresponding bases; hook on fourth pereopod less prominently produced, not reaching basioischial articulation and not opposed by tubercle on basis. Coxa of fourth pereopod with massive boss having almost straight, rather than arched caudoventral margin, compressed laterally, and disposed in longitudinal plane of body; mesial and lateral surfaces of boss with setiferous punctations. Coxa of fifth pereopod lacking boss but with setiferous ventral membrane where some of setae arranged in mesially convergent rows (similar rows also present in *F. (F.) harpi* and in *F. (F.) jeanae*, but less conspicuous in former).

First pleopods (Fig. 1b, c, e) reaching coxae of third pereopods, carried deeply in sternum, and largely concealed by setae extending from ventral margin of sternum and from coxae of third and fourth pereopods. Proximomesial spur very weak. Shaft of appendages inclined through gentle arc; terminal elements acute to subacute; flattened, tapering, acute mesial process strongly curved near base, directed caudally; cephalic process, in form of corneous-edged, short blade, arising immediately cephalomesial to mesial process, disposed caudo-distally, not reaching arched, subspiciform, corneous central projection, which also directed caudally with apex pointing proximally toward base of appendage; tip of central projection slightly overreaching that of mesial process. Plumose setae extending

caudally from more distal level than in most crayfishes: series projecting from lateral superficial fold extending almost to base of distal fifth of appendage (setae similarly, but less conspicuously, disposed in *F. (F.) harpi*, not quite so far in *F. (F.) dissitus* and *F. (F.) jeanae*).

Allotypic female.—Differing from holotype in other than secondary sexual characteristics as follows: acumen reaching midlength of penultimate article of antennular peduncle; 2 or 3 small tubercles in positions occupied by cervical spines in some species of crayfishes; left anteroventral branchiostegal region with row of only 6 tubercles; main body of epistome with fovea little larger than punctations on adjacent antennal peduncles; spine on ventral surface of proximal podomere of antennular peduncle reduced to small tubercle, that on left rudimentary; opposable margin of fixed finger of chela with row of 9 (right) and 7 (left) tubercles distal to major tubercle; dorsomesial surface of carpus with row of 6 (right) or 5 (left) tubercles; ventral surface of merus of right cheliped with mesial row of 16 (left 15) and lateral one of 11 (left 12).

Annulus ventralis (Figs. 1j, 2e) deeply imbedded in sternum, 1.5 times as broad as long and firmly fused to sternite anterior to it. Region anterior to transverse ridge with oblique, caudosinistrally directed furrow leading to fossa; sinus arising in fossa and extending dextrally across median line where almost completing hairpin turn before following gentle arc almost to apex of submedian posterior angle of annulus. Postannular sclerite in form of half oval, about 0.5 length and almost 0.6 width of annulus; rounded anterior section strongly dorsally inclined. Features of thoracic sternal elements and basal podomere/s of pereopods depicted in Fig. 2e.

Morphotypic male, form II.—Differing from holotype in other than secondary sexual characteristics as follows: Rostrum with anterosinistral margin slightly disfigured, but margins gently converging anteriorly, not

setting off acumen, apex reaching midlength of penultimate podomere of antennular peduncle; cephalic section of telson with small, movable spine at caudodextral angle and minute one at caudosinistral angle; 3 or 5 tubercles in ventrolateral row flanking mesial series on palm of chela; both dorsal and ventral longitudinal ridges on fingers prominent; opposable margin of fixed finger with row of 9 (right) and 11 (left) tubercles; proximal concavity on opposable margin of dactyl without tubercles; tubercles of dorsal row on merus very weak, numbers in ventral row within ranges occurring in holotype; basioischial podomere with 2 (left) and 4 (right) tubercles, respectively; hooks on ischia of neither third nor fourth pereopods reaching basioischial articulation, distinctly weaker than those in holotype, and boss on coxa of fourth pereopod less robust.

First pleopod (Fig. 2b, c) with shaft much like that of holotype, but proximomesial spur moderately well developed, and setae (not illustrated) neither so long nor so conspicuously plumose; terminal elements non-corneous; mesial process less flattened than in holotype but of similar mien and disposition; cephalic process reduced to small, subtriangular, acute prominence pressed against mesial base of central projection and not evident in lateral aspect of appendage; central projection, largest of terminal elements and much more robust than that in holotype, disposed as in latter, but shorter, much less slender, and abutting base of mesial process.

Color notes.—(Based on recently molted second form male that had been in alcohol for about 14 days.) Ground color of carapace pale pinkish lavender, fading ventrally almost to cream; rostrum with pale brownish suffusion; margins of acumen and crest of postorbital ridges burgundy. Gastric region with broad transverse burgundy band abutting cervical groove, and pair of similarly colored small spots short distance anterior to band; pair of paler, larger, but much less sharply delimited spots marking pos-

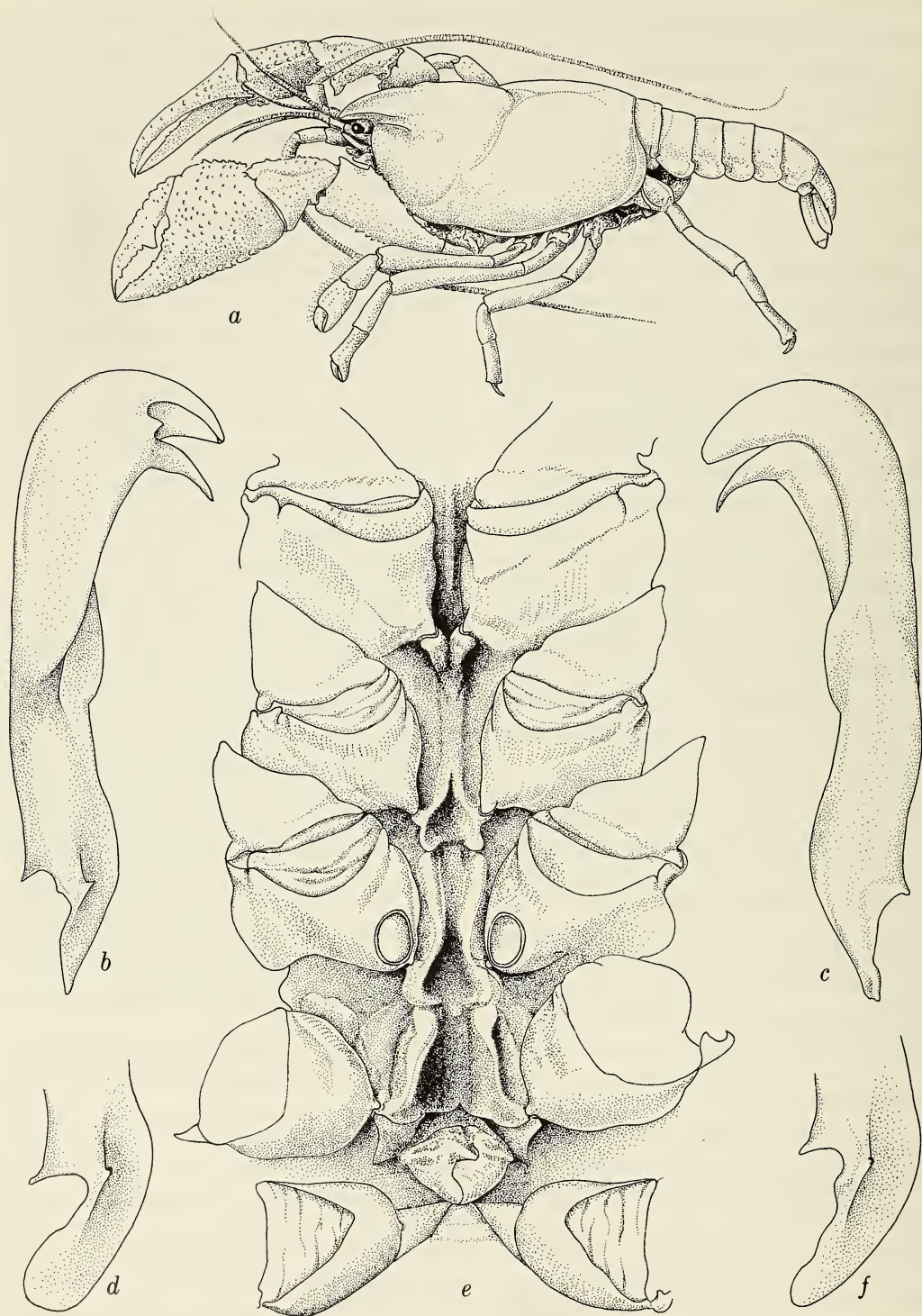


Fig. 2. *Fallicambarus (F.) devastator*: a, Dorsolateral view of paratypic male, form I; b, Mesial view of first pleopod of morphotype; c, Lateral view of first pleopod of morphotype; d, f, Mesial view of basal part of left first pleopods of paratypic first form males; e, Ventral view of sternal elements of thoracic region of allotype.

terior tumescences of postorbital ridges, and another more mesial pair between latter. Anterodorsal margin of branchiostegites with very narrow burgundy band broadening medially where spanning anterior wedge of areola; similarly colored narrow band on posterodorsal margin of carapace. Abdomen also pale pinkish lavender; caudal margins of terga with hair line of burgundy. Cheliped with merus cream basally, gradually becoming suffused with pinkish lavender distally, and with brownish blush along dorsal subserrate ridge broadening distally; carpus also basically pinkish lavender but with straw brown suffusion dorsomesially, tubercles burgundy, larger ones with pale tips; dorsomesial face of chela with palm and basal part of dactyl pinkish lavender to purplish; fingers fading to pale blue distally, and palm and lateral part of fixed finger fading to cream laterally; most dorsal tubercles situated mesiad of cream, subserrate lateral row dark purple to dark brown, some of larger ones with pale tips; ventral surface of all mentioned podomeres pinkish to cream. Remaining pereopods with pinkish to pale blue blush dorsally, pinkish to almost cream ventrally.

Size.—The largest specimen examined is a female having a carapace length of 50.5 (postorbital carapace length 44.7) mm. The smallest first form male, the holotype, has corresponding lengths of 43.1 and 38.2 mm, respectively. Neither ovigerous females nor ones carrying young are available for determining measurements.

Type locality.—Prairie grass-land at Angelina County Airport in Burke Community, about 5 miles (8 km) south of Lufkin, Angelina County, Texas.

Disposition of types.—The holotype, allotype, and morphotype (USNM 218546, 218547, and 218548, respectively) are deposited in the National Museum of Natural History, Smithsonian Institution, as are the paratypes consisting of 2 ♂ I, 7 ♂ II, and 10 ♀.

Range and specimens examined.—All of the specimens available were collected at

Table 1.—Measurements (mm) of *Fallicambarus (F.) devastator*.

	Holotype	Allotype	Morpho- type
Carapace:			
Entire length	43.1	49.1	43.0
Postorbital length	38.2	43.0	37.7
Width	18.9	21.8	19.2
Height	19.1	21.6	19.0
Areola:			
Width	0	0	0
Length	17.0	18.5	16.7
Rostrum:			
Width	6.2	7.2	5.9
Length	6.4	7.6	6.0
Right chela:			
Length, palm mesial margin	9.1	9.7	8.0
Palm width	16.3	18.9	15.3
Length, lateral margin	32.4	36.3	32.6
Dactyl length	broken	28.5	24.6
Abdomen:			
Width	13.6	14.9	12.6
Length	36.8	43.0	36.3

the type locality by the second author on 23 October, 1986 (1 ♂ I, 10 ♀), and 24 November, 1986 (2 ♂ I, 8 ♂ II, 1 ♀).

Variations.—The shape of the rostrum varies considerably: the margins may converge gently from a broad base to the apex, the acumen merging imperceptibly with the basal part, or the base of the acumen may be marked by almost an angle where the degree of convergence of the margins increases rather suddenly. The uninjured apex in all recently molted individuals consists of a corneous, acute, upturned tubercle, but the tip is apparently abraded during the intermolt stages, and in some individuals there is no indication of a dorsal attitude assumed by the apex. The basal segment of the antennule may or may not bear a spine on the ventral surface. The distomesial margin of the lamelliform part of the antennal scale may be rounded or straight, extending proximomesially from the base of the distolateral spine in a straight line; the spine, itself

subject to abrasion, is quite variable in size, sometimes not reaching the distal margin of the basal article of the antennular peduncle. The anterior section of the telson may or may not possess a small movable spine at the caudolateral angle; the fixed, more laterally situated spine present in most other cambarids is absent. The dorsomedian ridge of the mesial ramus of the uropod may or may not end in a weak spine; if present, it never reaches the distal margin of the ramus. A row of six or seven tubercles is characteristic of the mesial margin of the palm of the chela as is a cluster, sometimes arising from a common tumescence, of two or three tubercles near the opposable base of the fixed finger. The excavation on the basal part of the opposable margin of the dactyl may or may not bear a small tubercle that lies immediately proximal to the conspicuous tubercle marking the distal extremity of the excavation. Of the three first form males available, only in the holotype are the central projections of both first pleopods entire; in one of the specimens, the projection on the left appendage is broken near the base, that on the right is quite short and clearly pointed, but it is very dark, suggesting that an injury, and perhaps an infection, was responsible for what is believed to be an abnormality. In the other specimen, the central projection of the sinistral appendage is torn. The mesial process is also subject to variation, perhaps influenced by injury, for in one specimen instead of tapering to a single apex it ends in three short spines.

Relationships.—Of the six species recognized herein as belonging to the nominate subgenus, *Fallicambarus (F.) devastator* probably has its closest affinities with *F. (F.) strawni* (Reimer, 1966), *F. (F.) macneesei* (Black, 1967), and *F. (F.) harpi* Hobbs and Robison (1985). Among the similarities existing among them is a moderately- to well-developed cephalic process on the first pleopod of the first form male, a primitive feature shared with no other species of the

genus. Only in *F. (F.) macneesei*, *F. (F.) dissitus* (Penn, 1955), and *F. (F.) devastator* do the males possess hooks on the ischia of the third and fourth pairs of pereopods, and *devastator* is easily distinguished from the other two by lacking distolateral spines on the mesial ramus of the uropods. The cheliped of *F. (F.) devastator* resembles that of *F. (F.) harpi* in that the gape at the base of the dactyl is opposed by a prominent tubercular cluster on the fixed finger rather than by a single conspicuously large tubercle as is present in *F. (F.) jeanae* Hobbs (1973) and *F. (F.) spectrum* Hobbs (1973). All of the members of the subgenus *Fallicambarus* possess a proximomesial spur on the first pleopod of the first form male, but the latter, which is especially conspicuous in *dissitus*, is, by comparison, almost rudimentary in available first form males of *devastator* (Fig. 2d, f). The distally pointed mesial ramus and the distal unit of the lateral ramus of the uropod are more nearly triangular in *devastator* than in any other species of the genus and represent extreme departures from the more rounded to subtruncate generalized condition found in other congeners.

Remarks.—All of the specimens at hand were obtained on warm, rainy nights when they were either at the mouth of a burrow or wandering about the grassy area. Perhaps as many as 100 individuals, including mostly young having total lengths of approximately 25 to 40 mm, were seen in an area of about 1000 square feet (90 m²). All eight of the second form males had clean exoskeletons, suggesting a recent molt, that contrast conspicuously with the crusty ones of the three first form males.

Key to the Crayfishes of the Subgenus *Fallicambarus*

1. Mesial ramus of uropod with distolateral spine 2
- Mesial ramus of uropod without distolateral spine 3
2. Distomedian spine on mesial ramus

- of uropod not reaching distal margin of ramus *dissitus*
- Distomedian spine on mesial ramus of uropod extending much beyond distal margin of ramus *macneesei*
- 3. Telson lacking lateral incision, no trace of transverse suture *strawni*
- Telson with shallow lateral incision and at least paired oblique lateral sutures 4
- 4. Hooks on ischia of third and fourth pereopods; both rami of uropods tapering distally to subangular apex *devastator*
- Hooks on ischia of third pereopods only; both rami of uropods rounded distally 5
- 5. First pleopod of first form male with cephalic process *harpi*
- First pleopod of first form male lacking cephalic process *jeanae*

[*Fallicambarus (F.) spectrum* Hobbs (1973) is here considered to be a color morph of *F. (F.) jeanae*.]

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